DOE Wire Workshop, St. Petersburg, FL, January 21-22, 2003
Summary of Late-Breaking News Session

Steve Foltyn (LANL) addressed the question of how good texture needs to be, a question that was frequently raised during the first day. He claimed that "single-crystal type" J_c values were obtained using IBAD MgO films that gave a FWHM of 2.7° for the in-plane texture of YBCO.

Paul Berdahl (LBNL) described the ITEX (i.e., Ion Texturing) process, a simple, robust method for producing buffer layers.

David Shaw (SUNY-Buffalo) described W_xN as a possible buffer layer, saying that it is a good oxygen diffusion barrier, has good electrical conductivity and good mechanical properties, and its lattice constant matches that of MgO. A question was raised regarding its chemical stability under YBCO deposition conditions.

Sankar Sambasivan (ATF, Inc.) talked about the ECONO (i.e., Epitaxial Conversion to Oxide via Nitride Oxidation) process in which Y and Zr are deposited as a nitride that is then oxidized to form YSZ. He claimed that the process eliminates the need for a sulfur superstructure when working with a RABiTS substrate.

Winnie Wong-Ng (NIST) is exploring the phase diagrams of various rare earth (RE)-123 compounds, for example studying the solid solubility between them. Compositions in which Nd is substituted for Ba are of particular interest, because preliminary data show their J_c are higher than that of Y-123 at magnetic fields of1-2 Tesla.

Larry Cook (NIST) discussed two areas of research. He is studying phase relations that may be important in processes that involve BaF_2, looking into the possibility that $Ba(OH)_2$ may play an important role through the formation of a liquid phase. He is also trying to sort out discrepancies in thermodynamic data for MgB_2 so that he can determine its thermal stability limit.

Balu Balachandran (ANL) described two new directions for research in Japan. Self-epitaxy of CeO_2 on IBAD-$Gd_2Zr_2O_7$ films is being studied by Yamada at ISTEC-SRL; it has been used to obtain J_c of 3.8 MA/cm^2 at 77 K in self-field. Fujino at Sumitomo is investigating the use of Ho-123, because its deposition rate can be three times faster than that of Y-123.

A common theme throughout the first day of the workshop was the dependence of i_c on the thickness of YBCO. **Alex Gurevich (U. Wisc.-Madison)** presented a model that he developed to describe this. He reported that the model fits Feldmann's experimental data of i_c through the thickness of a YBCO film.

Sharmila Mukhopadhyay (Wright State U.) pointed out that the interfaces in coated conductors are poorly understood at present. She described work in which she is studying the phase relations at various interfaces to improve this understanding.

Mas Suenaga (BNL) described a model for AC losses in coated conductors and pointed out that defects in the conductors influence the AC losses by disturbing the uniformity of magnetic fields in the conductor.

Leonardo Civale (LANL) showed i_c for PLD-IBAD films in magnetic fields up to 18 Tesla. He showed that single and multilayer YBCO films have similar performances in magnetic fields with strengths >several Tesla. He also pointed out that decreasing temperature by ≈10 K can significantly alter the large drop in J_c that is typically seen at low magnetic fields (<0.5 Tesla).

Paul Barnes (Air Force Research Lab.) described a technique in which he fabricates a multilayer structure that contains fine 211 inclusions. He showed that J_c for the multilayer films was ≈2 times higher than that of a single layer film at 1.5 Tesla.

Mike Tomsic (Hyper Tech Research) described his capability to produce MgB_2 in both mono- and multi-filament configurations. He reported that, at 20 K, these conductors have a J_c up to 100 kA/cm^2 in self-field and a J_e of 15 kA/cm^2 in magnetic fields of 1-4 Tesla.